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JOINT COSTS WITH ESPECIAL REGARD TO RAILWAYS

SUMMARY

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IN his recent book, *Wealth and Welfare*, Professor Pigou challenges the prevailing view concerning the applicability of joint costs to railways; and later, in a controversy with the proponent of that view, Professor Taussig, he seeks to maintain his position.¹ The prevailing view is too familiar to require restatement. Professor Pigou's contention, briefly stated, is that the concept of joint costs should be narrowed considerably, and should be applied only (1) when two different things are necessarily produced together — joint supply; and (2) when under competition the same rates would not be charged. Thus iron and copper transportation services would not be subject to the principle of joint cost, according to Professor Pigou, for (1) the transportation of the one does not necessarily entail the transportation of

¹ Quarterly Journal of Economics, 1913.

the other, and (2) under free competition transportation agencies would charge the same rates per ton per mile for the two metals.

Without further direct discussion of the arguments of these two noted economists, the writer will present as systematically as possible his own ideas, and inquire what modification, if any, Professor Pigou's criticism calls for.

I

Joint costs may be tentatively defined as those expenses, incurred in the joint production of two or more different utilities, which can not be imputed to any one of the utilities separately. Back of this definition may be seen several factors: difference in utility; joint production, in a primary or in a secondary sense; indirect relation between the amount of cost incurred and the quantity of utility produced. Accordingly, these factors will be taken up in order.

(1) Most obviously, if the expense is to be classed as joint, *two or more different utilities must result from the expenditure*. Production involves utility as much as cost, and to have joint production we must have joint utility. Just here, however, lies one of the grounds of misunderstanding and dispute; for what constitutes a difference in utility? Must we have different physical things, such as coal and copper? Must things to be different have different kinds (qualitatively) of utility and be wanted in different markets? In the case of railway service, should we consider "transport" as a single utility?

Taking up the last query first, we find Professor Pigou holding to an affirmative answer — tho later he shifts his ground¹ — insisting that, in so far as the meaning of

¹ Quarterly Journal of Economics, vol. xxvii, p. 689.

"joint" is concerned, a railway produces a single kind of utility in hauling goods of various sorts from A to B. But it is to be remembered that car miles and train miles do not measure service;¹ that transportation service is measured in ton miles. Now tons represent commodities hauled, and commodities differ in their relation to production. They differ in demand, both in kind of demand and in location of demand. (a) Commodities differ in their capacity for receiving additional utility through transportation, as is well-known to be the case as between "low grade" goods such as sand and "high grade" goods such as glass ware — the one does not "stand transportation" as well as the other. (b) Commodities also differ in the location of demand, being valued in different markets. In such cases, they may be unrelated on the demand side as to the determination of their values, and are, in a very practical sense, different utilities. As Professor Taussig remarks, "The fact that they are supplied to separate groups of demanders . . . shows that, tho both dubbed 'transport' they do not constitute a homogeneous commodity."

It seems to the writer that here, as elsewhere, confusion is likely to arise from failure to consider utility in relation to cost. Inasmuch as cost must be sanctioned by utility, difference in degree of utility or in intensity of demand — which may be generally assumed when the markets are different — means different ability to bear cost. But if the expense cannot be specifically assigned, and it is therefore not known how much of the total item is attributable to iron and how much to copper, under competition the joint expense will be apportioned according to degree of utility. In the bargaining between shipper and carrier the joint item (supplementary expense) will fall more largely upon the shipper

¹ See my article on "Railway Statistics" in Quarterly Publications of American Statistical Association, vol. xii, pp. 201, 209, 226.

who is more anxious to ship, and he will be the one for whose commodity there is a more intense demand. Assume even competing railways, and further assume that all prime, or specifically assignable, expenses are the same for the two commodities; if now there is a large element of supplementary expenses there is a tendency to assign such expenses where they will lie the easiest, or where "the traffic will bear" them best, which point depends upon demand and market conditions in the two cases. Take the case of iron and copper. These commodities are not so very different in physical character as affecting costs of transportation. The real difference, as expressed in different railway rates, therefore, lies in the difference in markets and demand. Put in another way, discrimination in rates is initiated by the difference in degree of utility.

Professor Pigou maintains, however, that competition would establish a uniform rate on the two commodities, arguing¹ that if the demand is higher in one market than the other, the carrier will transfer transportation to the higher-priced one, and that this transfer will start independently of the existence of joint costs. But what is a "higher-priced" market here? Since the effectiveness of demand for transport depends upon chance of gain in furnishing transport, it must be the one in which the quantity, "rate minus expense," is the greater. This quantity obviously depends in part upon the amount of expense; and, as a large part of expenses are not specifically assignable, an opportunity for difference in judgment and arbitrary treatment is present at the beginning, with the result that discrimination is likely. At the outset, then, we start with a probability of discrimination based on joint costs; and the reasoning of Professor Pigou is vitiated by making the criterion of

¹ Quarterly Journal of Economics, vol xxvii, p 691.

high-priced and low-priced markets (for transportation) depend upon a quantity which, if it be assumed to be non-discriminatory, puts him in the position of begging his question.

Here the question arises, can we not, then, have joint expense in the case of a single commodity, such as coal? In two different towns equally distant from shipping point and served by a given railway, the situation may easily be as follows; the citizens of A have a greater purchasing power and a more intense want of coal than the citizens of B. In B there may be a small local mine and an abundance of wood; and this alone would cause a different demand schedule due to availability of substitutes. Under this assumption, the railway or railways will, if they charge the same rate to each place, (a) either find no effective demand for transportation to one of the points, the rate being too high; or (b) serve both points, but supply one with a greater volume of traffic than the other. In the former case, there is nothing to do but confine traffic to the high-demand market, B. If the lower rate will pay specific, or prime, expenses it will probably be put in. In the latter case, the problem is at once complicated by considerations of effect of rate adjustment on assignable expenses. If an increased volume of traffic will decrease prime expenses per unit there will probably be an increased demand (in the sense of a larger number of units) for transportation to A, the larger-demand point, and the rate per unit of traffic will carry a smaller contribution to joint expenses than the rate per unit of traffic to the smaller-demand point, B.

The writer, therefore, has been led to the conclusion that discrimination, or difference in rates ¹ as related to

¹ Discrimination in two senses must be borne in mind. In the true competitive sense, the same rates should not be required, but only rates equaling cost.

expenses, is probable wherever joint costs exist, and that joint costs exist much more widely than is commonly supposed; the wider field for them being due to the great extent to which differences in utility are found even among similar commodities — perhaps among shipments of the same commodity.¹ Indeed, the only case in which there is no possible problem of discrimination arising out of joint cost in the railway business, exists when a single commodity is hauled to a single market. A coal road from A to B might present such a case; but, even here, it is to be observed that several markets may exist in a given locality (B), as is illustrated by the different demands for coal in domestic industrial use.

So much for the first factor in the constitution of joint cost. For the rest, we must pass from the utility side to that of cost. Here the most obvious factor is: (2) *The expense concerned must be necessary to the existence of each and every one of the different utilities.* Unless the expense is incurred, no one of the utilities could be brought into existence. (Unless the interest can be paid upon a railway's bonds, either the road can not come into existence or can not continue to exist, and consequently can neither haul freight from A to B nor from B to A. Also, it can haul neither iron nor copper.)

This seems to the writer the better way of putting the idea that to be joint the one product must be a necessary result of the production of the other. One reason for this conclusion is that the idea of necessity is one of

¹ It may be worth while to note that any great refinement of analysis would surely deal with various important interrelations of demand. For instance there is the fact of widespread substitution. If the supply of lumber decreases, the demand for cement increases. Motor vehicles replace horses in part. The demands for corn and wheat as food stuffs are closely interwoven. In such cases the markets overlap, and the *difference* in utility of different commodities may become small or vanish.

those seemingly clear concepts which in reality is quite lacking in definiteness. Necessity may be physical or economic. The case of physical necessity is well illustrated by the classic wool and mutton: one can't for the life of him produce mutton without growing a little wool. The problem here is to get some use or gain out of a necessary "by-product." There is, as it were, unused capacity in the plant as it actually exists, the unused portion being a separate and distinct item. This may be called *primary jointness*; for the expense is joint to start with, and it is because it is joint that it can not be assigned.

In passing to the case of secondary jointness, an illustration will be of service. Back in the '70s cotton seed was commonly regarded by the southern planter as a nuisance and he was wont either to burn it or to cast it into nearby streams. So common did this latter practice become that laws were passed to prohibit it. The question is, was cotton seed a "by-product?" Was this joint production? One's first thought is of the present status of cotton seed, for it is a valuable product. But a moment's consideration shows that in the earlier days it was of no more use than are prune seeds today — even less, for it was an encumbrance — a disutility. Thus, tho necessarily grown, cotton seed was not product in the economic sense, nor could it be used to illustrate joint production. Today all this is changed. First, the seed became valuable for oil, meal, and cake, with the result that it became not only a physically necessary adjunct but a by-product — in the economic sense of the term, a product. Then, under the operation of competition, it became more than a *desirable* or valuable by-product: it became a *necessary* side line, and now the marketing of the seed is essential to profitable cotton farming.

By *secondary jointness*, the writer means such common production as is necessary as a condition of profit. After all, this is the true economic joint expense. The one product can be produced without the other, but only at a loss. For example, take an understocked store. The rent, based upon the potentialities of the location, eats up all the income, and some new line must be added in order to make a profit. The problem here is, not to get some gain from a physically necessary by-product, but to get some by-product to help meet an economically necessary expense. It is not a case of unused capacity, as in primary jointness, but of unused opportunity. Here the expense becomes joint, because a "side line" must be carried in order to enable the business to exist under competition.

It is important to note well the significance of the word "necessary" as used in the case of secondary joint cost. In the first place, the idea of necessity lies in the fact that some distinct item of output or traffic must be taken on, if the business is to succeed under normal and legitimate competitive conditions.¹ In the second place, it follows from the preceding statement that if the expense is not conducive to normal competitive profit — is not necessary in the sense just mentioned — it can not be classed as joint in any real or causally significant sense.

But the cotton illustration suggests the existence of *combinations of primary and secondary joint expenses*. Cotton is a physically necessary by-product; it has also become an economically necessary side line. In such

¹ If we are to have a useful concept of joint costs we must rule out such expenses as are incurred in investments or operations which result in a net loss to society. If, allowing sufficient time, it appears that the extension can not pay for itself or the equipment brings gain only to the ring of directors who sold it to the railroad corporation, these things can not be considered either necessary or jointly productive. Fraud and violence are fatal to that free exchange which is essential to the conservation of society, under the existing order. (See Haney, "Social Point of View," in *Quarterly Journal of Economics*, vol. xxviii, pp. 319-321.)

cases, not only is a large proportion of the expenses of production inseparably and necessarily joint, but also there is bound to be joint sale with interrelated prices.

The bearing of these considerations upon railway expenses should be fairly plain. Here there is no physical necessity as in the mutton-wool case. True, it might be argued that the case of back-hauls is of this sort, and this is probably why Professor Pigou recognizes the back-haul as a case of joint expense. But this is another illustration of confusing physical performance with economic service; for it is cars that have to be hauled back, not freight, and the railway *could* keep on making up trains at B merely to get its equipment back to a sole source of traffic at A. In the case of railway transportation, then, joint costs are apparently always of the secondary type — tho none the less joint on that account.

The fact is that, when time and place utilities are concerned, joint production differs somewhat from the joint production involved in creating form utilities of the typical sort. In producing wool and mutton, coal and coke, lint and seed, silver and lead, lumber and bark, materials combined by nature are separated and the one necessarily leaves the other; while in moving commodities from one point to another no such separation is involved.

An interesting case that may be taken to illustrate the preceding points — one which, if correctly chosen, shows the great range of cases in which one class of traffic may be said to be economically necessary to another — is furnished by the interrelation of commodities as raw materials for a finished product. Take coal, limestone, and iron ore for steel. If the steel industry is to prosper at a given point, if the materials must be

hauled from another given area, and if the same railway system serves that area, then a case of strong economic necessity exists. Another class of necessity in joint production comes, under private operation, from public regulation: if a railway is compelled to operate a passenger car or train between two points or to haul the mails on passenger trains, another kind of necessity compels an expense that is joint with the expenses for other services.

(3) *There is no direct relation between the amount of expense and the amount of the output of any one of the utilities concerned.* A reduction in the amount of cotton seed produced will not cause a proportionate reduction in the cost of producing lint and seed. Nor will a reduction in the amount of freight hauled from A to B reduce by a proportionate amount the expense of hauling freight from B to A. There are really two cases here: (a) In some cases the joint expenses would not be reduced at all by diminishing the output of any one of the joint products. (These are constant joint expenses.) (b) In other cases, there may be a reduction but not a proportionate one (variable joint expenses).

Constant joint expenses are found in the shape of "fixed charges" and part of "general expenses"; interest, rentals, and salaries of general officers illustrating the type. These constant expenses depend upon the size of plant and personnel needed to handle the maximum profitable business, being in this sense necessary for any part of the economically justifiable traffic. They can not be allocated specifically. They are not diminished by a decrease in amount of any item of traffic. Therefore, if used in common for transporting commodities to different markets, they come under the definition of joint expenses adopted in this paper.

But variable expenses may also be joint, as is the case with wear and tear on equipment and rails. Assuming them to be economically necessary, we merely note that, while they vary in direction with amount of traffic, they do not vary in proportion to the traffic; and the percentage occasioned by any one kind of traffic destined for any separate market can not be specifically assigned.

The importance of the distinctions which the foregoing classification assumes, has been questioned in a recent study by Professor J. M. Clark,¹ in which it is argued — as nearly as the writer can gather — that the two classifications “general (joint) *v.* special” and “fixed (constant) *v.* variable” really merge into one; that the distinction between constant and variable expenses is dependent upon the existence of joint and special expenses; and that the former distinction is not important. These conclusions appear to the writer to rest upon a failure to consider the utility side, and upon an overworked marginal analysis. In discussing an enlargement of plant occasioned by an increase in traffic, it is argued that “the increased capital instalment, when incurred, was clearly caused by a definite increase or increment of traffic, either existing or expected, and so was economically ‘special’ to that increment without which it would not have been incurred”; the idea being that, at the margin, general (joint) expenses become special, and consequently are variable. This reasoning, however, overlooks the significance of utility and different markets, with the result that “traffic” is treated as a single thing like Professor Pigou’s “transport.” Then, it is assumed that the whole situation is “caused” by the last increment of “traffic.” So common has this error in reasoning become since the advent of the Aus-

¹ J M Clark, “Standards of Reasonableness in Local Freight Discriminations,” in *Columbia University Studies*, vol xxxvii, pp 33 f

trian School that it might be made the occasion for a digression on the significance of margins. Suffice it to say that this marginal unit of "traffic" is not the only one, but owes its position to the aggregate situation in which each and all units play their part. It is, of course, the earlier or supposedly supra-marginal units that have given rise to general or special expenses, as the case may be, and have had the effects on railway policy indicated elsewhere in the discussion of discrimination.

It is further argued by Professor Clark that, by a reverse process, special (specific) costs may become general (joint), *e. g.*, in making a commodity rate (special) on a large block of traffic, maintenance and interest (general) must be considered. But what is a large block of traffic? Are all blocks large? And how much maintenance and interest will be imputed to the block?

In general, the scope and variety of joint costs are not recognized by Professor Clark. Not only are some constant and some variable, but part of the variable expenses are joint and part are special. Variable joint expenses may be regarded as special to large traffic units, and perhaps these variable expenses are the only ones meant; but constant joint expenses can be special only in a non-causal, marginal sense. Take interest on bonds, or maintenance of roadbed necessitated by washing. If some new commodity rate is established leading to the addition of a large block of new traffic, and if new tracks and stations must be added to handle the increase, it may seem that the new traffic is chargeable with the new expense. But a little closer scrutiny shows that there is no relation between the amount of the increase in expense and the traffic yield. Just as the investment in the original plant was not made with regard only to the first unit of traffic developed, so the new investment is not

made with the idea merely of accommodating the new traffic block. Interest and constant operating expenses — those which depend on size of plant — can not be specifically assigned to anything but the traffic as a whole, and the idea of “ unit ” is stultified by making it apply to a “ block of traffic ” that is a whole.

II

Some further conclusions seem to be warranted by the foregoing discussion.

In the first place, the category of joint cost is seen to be far from simple, for jointness may be of many different degrees. (a) The *differentness* which is essential to the existence of real jointness, may be expressed in difference in physical shape, appealing to different wants, or may lie in merely different intensities of demand existing in different markets for the same thing. On account of differences in this element in the make-up of joint cost, the ease of discrimination and its social importance may vary considerably. It will usually be easier to discriminate between shipments of iron and copper, than to discriminate between coal shipments whether to the same or to nearby points; but the latter discrimination is likely to have more harmful social results, as the industrial fate of persons and communities is apt to be more directly at stake. Of course, these differences in demand intensity may be great or small. Also, as already noted, the difference in kind of commodity may be more or less obliterated by substitution interrelations. Thus cotton seed oil products and lard, beef and mutton, and the like, are different things with similar demand schedules; while corn and wheat, wool and cotton, cement and lumber, though interrelated, are economically different in a greater degree.

(b) On the cost side, the necessity of the jointness of production admits of degrees, running from physical (primary) necessity to economic (secondary) necessity and to compound (physical and economic) necessity. Bark and wool and coke have to be produced, technically speaking, when lumber and mutton and gas are produced; it is not true in the same sense that a druggist has to sell soda water or a railway carry mail, express, and all kinds of freight and passengers. In the former cases, the "by-products" may be thrown away, as cotton seed once was, or they may be sold independently of the main product, with or without any attempt to allocate any of the joint cost to them. If the price policy adopted is one of treating the joint products as complementary parts of a whole, a large part of the cost *must* be regarded as joint. But in the latter cases, there can be no question of throwing away or of independent sale: the economically necessary side line must be put on the market (or markets) jointly. Moreover, with purely secondary joint expenses it should be feasible to distinguish a larger part of the total expenses as specific (prime) to each of the separate products; for they permit of more nearly complete technical division and of more historical and experimental separation than are possible with primary joint expenses. Thus, the druggist has to install his "fountain," buy his flavoring materials, hire his clerk, and conduct a special line of advertising; and the coal railway has to build a branch from A to C, or an extension to connect with the copper ore region. Also, the druggist can keep account of the time that he bestows upon the soda water branch of his business; and the railway management can do much to record separate costs of accounting and of handling at terminals, separate risks, and the like, to say nothing of experiments to ascertain what part of maintenance

expenses are due to traffic wear and what to weather. There is more of the arbitrary in the situation, and the amount of the joint element in the expense account depends to a greater extent on the price policy pursued.

In each of these classes, too, there are degrees: in the case of railways, back-haul expenses may be said to be more of a necessity than those incurred in hauling coal from A to either of two different markets at B and C; and the latter, perhaps, than the joint account involved in handling both coal and copper between A and B—tho these are questions of fact, and may vary with circumstances.

Taking degrees both of difference in demand schedule and of difference in necessity of joint production into consideration, a kind of double necessity may or may not be present. This will depend on the character of the product as a necessity of consumption, and, as it introduces the social point of view, it suggests important considerations for public policy. If the product concerned is a necessity (such as corn, beef, and cotton), and if the product is necessarily joined with another product in production, then there is a double necessity. But if the product is wholly or partly a luxury, as is the case with much railway service, both freight and passenger, then the jointness is not necessary, wholly or in part, and the field of joint expenses might be reduced without injury to society.

(c) Finally, the degree of relationship between the output of the several joint products and the amount of the joint expense differs. It is a matter of general knowledge that some joint expenses are, for any given stage of industrial development, fixed; while others are variable, changing in the direction of the volume of output. Within each of these classes there are degrees.

All this evidences great complexity. Is it not this complexity that explains much of the diversity of opinion concerning joint costs? So the writer believes; and he hopes to have done a service in presenting an analysis that may serve to clarify the issues raised.

In the second place, it is the writer's judgment that it is expedient to adopt a broad definition of joint costs. The debate between Professor Pigou and Professor Taussig, in so far as principles are concerned, seems to come to a question of the expediency of a broad or a narrow definition; and the writer finds his conclusion more in accord with Professor Taussig's views. The great practical test of the significance of joint cost lies in discrimination; and, as has appeared, any degree of jointness, as here defined, is likely to give rise to some discrimination. It is doubtful if the degree of discrimination is in any quantitative relation to the degree of jointness, for, the occasion arising, many motives may actuate both railway and shipper in availing themselves of it. If the broad definition be adopted, all kinds of differentness in utility, and all degrees in necessity of joint production will be recognized as factors in establishing jointness of cost. Both primary and secondary jointness would be included, tho the distinction would but be emphasized.

In the third place, the relation between joint costs and monopoly as affecting discrimination is important. Of course, the existence of monopoly will affect the practice of discrimination by a railway, and also affect the working of joint cost toward discrimination; tho that is far from denying a distinct tendency to discriminate, proceeding from joint costs as such. Joint costs invite discrimination, by making it easy to fall into, and difficult to prove. Indeed, a large body of supplementary expenses makes it nearly impossible to avoid discrimination.

As in the case of monopoly price, there is a tendency, already discussed, to allocate a large proportion to the portions of traffic or output that will bear it. But when monopoly is added to joint cost — and a partial monopoly, at least, is always added in the normal railway business¹ — the discrimination that is based upon joint cost is, as it were, aided and abetted. Under competition, the allocation of joint expenses will probably be less arbitrary than in the case of monopoly, for the degrees of demand will be more nicely graded and the necessity of joint production will be more severely tested. Monopoly gives power so to adjust supply in classes and amounts as not merely to discriminate but to discriminate so as to get maximum net returns. More than this, monopoly may induce a policy of independent sales for the joint products, and thus bring about what may be called absolute discrimination. If a dominant beef trust should desire, it might give meat away as a premium on hides. It can hardly be denied, then, that if monopoly in transportation could be removed, discrimination would be reduced. (This conclusion assumes that railway monopoly is not complete and unregulated. If monopoly be complete and unregulated, joint costs seem to have little social significance, for then discrimination is at the absolute discretion of the monopolist, with no competition or law to compel an allocation of costs.² But regulation or the existence of some competition may compel greater attention to costs in making prices, and consequently give importance to any element of jointness.)

¹ Indeed, monopoly had better be assumed, and the question raised be, not "What would joint costs amount to if there were no monopoly?" but "How do joint costs affect monopoly?" In a way, the question of what would be without monopoly, is futile, a railway being "naturally" a partial monopoly

² It would always be desirable to the monopolist, however, to know costs and to allocate joint expenses most rationally; and two equally intelligent monopolists might, if in a joint-cost business, adopt different price schedules.

Vice versa, joint costs play a part in causing monopoly and in the fixation of monopoly price. When competing grocers cut sugar prices, we do not fear monopoly. We know that they know what the expenses assignable to their separate commodities are; that the procedure is not necessary; and that as soon as found unprofitable it will be dropped. But when competing oil, packing-house, and railway companies cut prices on their products, we become suspicious, and our suspicions are justified. In these latter cases, the products concerned are of necessity jointly produced at a joint expense, with the result that specific assignment of "cost of production" is impossible (and will not be attempted as long as not the most profitable course).¹ Moreover, different markets being involved, one product can be cut without demoralizing the market for the other. And, finally, according to our third factor in the constitution of joint cost, an increase in the output of one commodity or service (if possible) does not proportionally increase expenses. In fact, a part of the "fixed costs" of the industrial world are fixed, not because of technical conditions affecting the production of a single commodity, but because they are incurred on joint account for different commodities.² If, now, we add that in public-service industries government regulation, like competition, is made more difficult and uncertain by the existence of joint costs, the case is complete.

The case of local freight discrimination is too often ascribed to mere monopoly, as tho the railway were

¹ It is a condition essential to the existence of competition as a normal force that the competing units make some profits and that they be able to drop out in case they cease to do so. If the amount of the profit attributable to any particular operation is uncertain, and the production of any particular commodity or service is necessarily continued with some other product, the working of competition is obviously affected.

² It follows as a corollary that joint production is in some cases partly responsible for the existence of the condition of "increasing returns," with an obvious relation to monopoly.

merely recouping itself for competitive losses, from local points which it has at its mercy. But the fact that the local point is dependent upon a line that necessarily serves other points that constitute separate markets, is a fundamental part of the situation, *i. e.*, the fact that the monopoly is coupled with joint costs fundamentally affects discrimination. The railway, by law — to say nothing of economic necessity — has to serve both competitive and local points, and a considerable part of its expenses, both fixed and variable, are not in proportion to the volume of its traffic to the competitive point, being joint to both points; therefore it keeps up the competition, even tho cutthroat, and discriminates in assigning expenses.

Finally, it seems to be suggested by the analysis here presented that we are compelled to attack the problem of regulating joint costs if we are to regulate rates effectively — or, if you please, if we are to make the regulation of rates less necessary. In the first place, the scope and volume of joint costs can be reduced. For example, one suggestion has been that the scope of jointness may be reduced by narrowing the territorial extent of accounting units, thus reducing diversity of traffic utilities and operating conditions (Wisconsin Express Case).¹ In some cases, as transportation between large industrial centers, considerable traffic specialization might be possible within the same territory; as one railway system might handle the bulk of the through passengers, another the coal traffic, and so with any traffic of large volume that is similar in cost and value per ton. Already too, through control of securities, construction, and service, we are seeing to it indirectly that there shall be some necessity for the existence of each railway and its

¹ Merchants' and Manufacturers' Association of Milwaukee v Wells, Fargo & Co et al; Railroad Commission of Wisconsin, May, 1913

equipment; and this suggests that, as the necessity of the by-product is one factor in joint costs, so, by restricting railway expansion to such branch-lines, back-hauls, and attraction of new traffic, as social welfare warrants, we may reduce somewhat the range of economic necessity and of secondary joint costs.¹ Probably, however, the greatest progress must come in such improved accounting analysis that closer relationships between expenses and output or traffic will be ascertained. By experimentation, the fullest advantage will be taken of the variable element in variable joint expense, an element which has not as yet been fully and accurately segregated.

A residuum of joint expenses that can not be precipitated by any reagent will remain; and this, the writer believes, may well be taken in hand by regulative commissions, just as the construction of new lines and issuance of securities and forms of accounting have been taken in hand. It would seem that to leave in the hands of private interests power to allocate so large an amount of expenses as, in the case of railways, our analysis shows to be joint, would give too much power to discriminate — to levy a sort of tax, if that inexact analogy may be used. The writer looks forward to another occasion to try to prove that it is wiser to base rates upon utility and cost — which means to adopt a system of allocating joint costs — than to allow the operation of the “value (?)—of-service” principle.

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¹ Cf. above, p. 240